

Seed/Catalyst-Free Growth of ZnO Nanoleaves on ZnO Seed Layer/Glass by Thermal Evaporation Method

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Abstract. We report the seed/catalyst-free growth of 2D ZnO nanoleaves via thermal evaporation method. These nanoleaves were grown on (75 ± 5 nm) ZnO seed layer, which were deposited on glass substrates by radio frequency (RF) sputtering. Prior to synthesized ZnO nanoleaves, the sputtered ZnO seeds were annealed using the continuous wave (CW) CO₂ laser at 450 °C in air for 15 min. The morphology and the structure of ZnO nanoleaves were investigated by controlling the preparation temperature of each of the Zn powder and the glass substrate under O₂ and Ar gases. Studies were carried out on ZnO nanoleaves using X-ray diffraction, field emission scanning electron microscopy and UV–vis spectrophotometer. The results showed that the sample grow in the hexagonal wurtzite structure with preferentially oriented along (002) direction, good crystallinity and high transmittance. This study serves as the basis for further research on the growth of 2D ZnO nanostructures on a cost-effective glass substrate and at low temperature.